Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claims 1- 45 (Cancelled)

46. (Previously Presented) A method, embodied in a computer program, for automated extraction data from a molecular array having features arranged in a regular pattern, the method comprising:

receiving a number of images of the molecular array, each produced by scanning the molecular array to determine intensities of data signals emanating from discrete positions on a surface of the molecular array;

estimating initial positions of selected marker features within an image of the molecular array;

calculating refined positions of the selected marker features within the image of the molecular array;

using the refined positions of the selected marker features to compute an initial coordinate system for locating features of the molecular array in the number of images of the molecular array;

using the initial coordinate system to locate positions of strong features within one or more images of the molecular array;

refining the positions of strong features within the one or more images of the molecular array by analyzing data signal intensity values in regions of the one or more images of the

molecular array that contain the strong features;

using the refined positions of strong features in the one or more images of the molecular array to calculate a refined coordinate system to locate positions of weak features within the number of images of the molecular array;

using the refined positions of strong features in the one or more images of the molecular array to calculate a refined coordinate system to locate positions of local background regions surrounding all strong and weak features within the number of images of the molecular array; and

extracting data from strong features, and their respective local background regions, within the number of images of the molecular array using the refined positions of strong features within the number of images of the molecular array and extracting data from weak features, and their respective local background regions, within the number of images of the molecular array using locations for the weak features calculated from the refined coordinate system.

47. (Previously Presented) The method of claim 46 wherein data signals emanating from discrete positions on the surface of the molecular array include:

fluorescent emission from fluorophores incorporated into molecules bound to features of the molecular array;

radiation emitted by radioisotopes incorporated into molecules bound to features of the molecular array; and

light emission from chemoluminescent moieties incorporated into molecules bound to features of the molecular array.

48. (Previously Presented) The method of claim 46 wherein each image of the number of

images comprise an array of pixels, each pixel having a data signal intensity value.

49. (Previously Presented) The method of claim 48 wherein the features of the molecular array are arranged in a rectilinear grid, wherein corner features are selected as marker features, and wherein estimating initial positions of selected marker features within an image of the molecular array further includes:

calculating row and column vectors by considering the values of pixels in rows and columns of the image;

determining a first and last peak in the row and column vectors; and

using pixel coordinates of the first and last peaks in the row vector to determine horizontal coordinates of the corner features and using pixel coordinates of the first and last peaks in the column vector to determine vertical coordinates of the corner features.

Claims 50-58 (Cancelled)

59. (Previously Presented) A system for automated extraction of data from a molecular array having features arranged in a regular pattern, the system comprising:

a scanning component that produces images of the molecular array representing intensities of data signals emitted from discrete positions on a surface of the molecular array;

a computer program that processes the images of the molecular array produced by the scanning component to index features in the images of the molecular array corresponding to molecules bound to features of the molecular array and that extracts data from the indexed features within images of the molecular array; and a computer for executing the computer program.

60. (Previously Presented) The system of claim 59 wherein data signal intensities emanating from discrete positions on the surface of the molecular array include:

radiation emitted by radioisotopes incorporated into molecules bound to features of the molecular array;

fluorescent emission from fluorophores incorporated into molecules bound to features of the molecular array; and

light emission from chemoluminescent moieties incorporated into molecules bound to features of the molecular array.

61. (Previously Presented) The system of claim 59 wherein the computer program processes the images of the molecular array and extracts data from indexed features within images of the molecular array by:

receiving a number of images of the molecular array produced by the scanning component;

estimating initial positions of selected marker features within an image of the molecular array;

calculating refined positions of the selected marker features within the image of the molecular array;

using the refined positions of the selected marker features to compute an initial coordinate system for locating features of the molecular array in the number of images of the molecular array;

using the initial coordinate system to locate positions of strong features within one or more images of the molecular array;

refining the positions of strong features within the one or more images of the molecular

array by analyzing data signal intensity values in regions of the one or more images of the molecular array that contain the strong features;

using the refined positions of strong features in the one or more images of the molecular array to calculate a refined coordinate system to locate positions of weak features within the number of images of the molecular array;

using the refined positions of strong features in the one or more images of the molecular array to calculate a refined coordinate system to locate positions of local background regions surrounding all strong and weak features within the number of images of the molecular array; and

extracting data from strong features, and their respective local background regions, within the number of images of the molecular array using the refined positions of strong features within the number of images of the molecular array and extracting data from weak features, and their respective local background regions, within the number of images of the molecular array using locations for the weak features calculated from the refined coordinate system.

Claims 62-68 (Cancelled)